

Preliminary Specification: Subject to Change without Notice

N-Channel 110 V MOSFET

Product summary

V_{DS} (V)	$R_{DS(on),max}$ (m Ω)	I_D (A)
110	18 @ $V_{GS} = 10V$	45 ⁽¹⁾

Features

- Low $R_{DS(on)}$ SGT technology
- Low thermal impedance
- Fast switching speed
- 100% avalanche tested

Applications

- DC/DC conversion
- Power switch
- Motor drives

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Package and ordering information

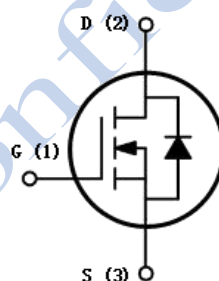
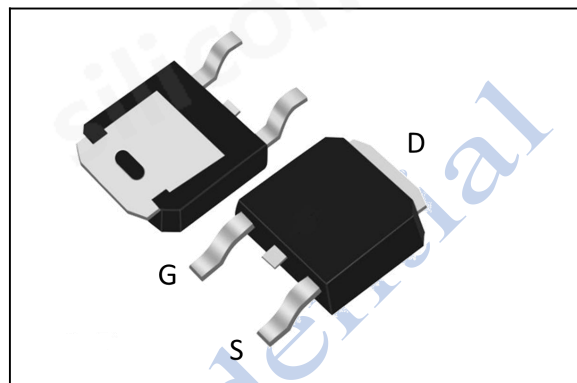
Ordering code	Package	Device code
SDN11K020DC-AA	TO252-3L	N11K020DC-AA

1. Maximum ratings

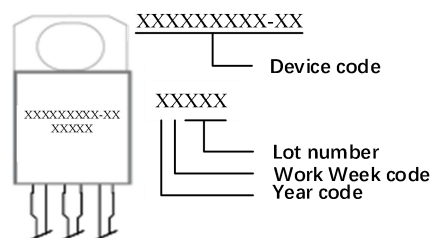
Absolute maximum ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-source voltage		V_{DS}	110	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current	$T_C = 25^\circ\text{C}$ ⁽¹⁾	I_D	45	A
	$T_C = 100^\circ\text{C}$		27	
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾		8.1	
Pulsed drain current ⁽²⁾		$I_{D,pulse}$	176	
Avalanche energy, single pulse ⁽³⁾		E_{AS}	65	mJ
Power dissipation	$T_C = 25^\circ\text{C}$	P_D	73.5	W
	$T_A = 25^\circ\text{C}$ ⁽⁴⁾		2.5	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

TO252-3L



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2. Thermal resistance ratings

Thermal resistance ratings				
Parameter		Symbol	Max.	Unit
Thermal resistance, junction-to-case	Steady state	$R_{\theta JC}$	1.7	°C/W
Thermal resistance, junction-to-ambient ⁽⁴⁾	Steady state	$R_{\theta JA}$	50	

3. Electrical Characteristics

Electrical characteristics (T _J = 25°C unless otherwise noted)						
Parameter	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Static parameter						
Drain to source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0 V, I _D = 250 μA	110			V
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1.3	2	2.7	V
Gate-body leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±20 V			±100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = 110 V, V _{GS} = 0 V			1	μA
Drain-source on-resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 10 A		14	18	mΩ
		V _{GS} = 4.5 V, I _D = 5 A		19	24	
Forward transconductance ⁽⁵⁾	g _{fs}	V _{DS} = 5 V, I _D = 10 A		30		S
Gate resistance	R _g	f = 1 MHz		1.8		Ω
Dynamic ⁽⁵⁾						
Total gate charge	Q _g	V _{DS} = 55 V, I _D = 5 A, V _{GS} = 4.5 V		8.6		nC
Total gate charge	Q _g	V _{DS} = 55 V, I _D = 10 A, V _{GS} = 10 V		15.1		nC
Gate-source charge	Q _{gs}			3.5		
Gate-drain charge	Q _{gd}			4.3		
Turn-on delay time	t _{d(on)}	V _{DS} = 55 V, I _D = 10 A, V _{GS} = 10 V, R _{GEN} = 1.6 Ω		2.5		ns
Rise time	t _r			4.4		
Turn-off delay time	t _{d(off)}			5.6		
Fall time	t _f			5.0		
Input capacitance	C _{iss}	V _{DS} = 55 V, V _{GS} = 0 V, f = 1 MHz		935		pF
Output capacitance	C _{oss}			232		
Reverse transfer capacitance	C _{rss}			9		
Reverse Diode Characteristics ⁽⁵⁾						
Diode forward voltage	V _{SD}	V _{GS} = 0 V, I _F = 10 A		0.9	1.1	V
Reverse recovery time	t _{rr}	V _{DS} = 55 V, I _F = 10 A, di/dt = 100 A/μs		30		ns
Reverse recovery charge	Q _{rr}			25		nC

Notes

- (1) Package limited.
- (2) Pulse width limited by maximum junction temperature.
- (3) $V_{DS} = 55\text{ V}, V_{GS} = 10\text{ V}, L = 1\text{ mH}$.
- (4) $R_{\theta JA}$ is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5x1.5 in. board of FR-4 material.
- (5) Guaranteed by design, not subject to production testing.

4. Electrical characteristics diagrams

Fig.1 Typ. transfer characteristics

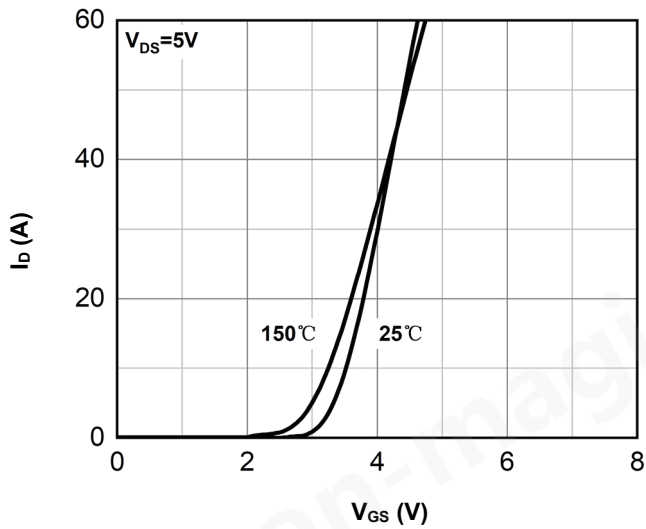


Fig.2 Typ. output characteristics

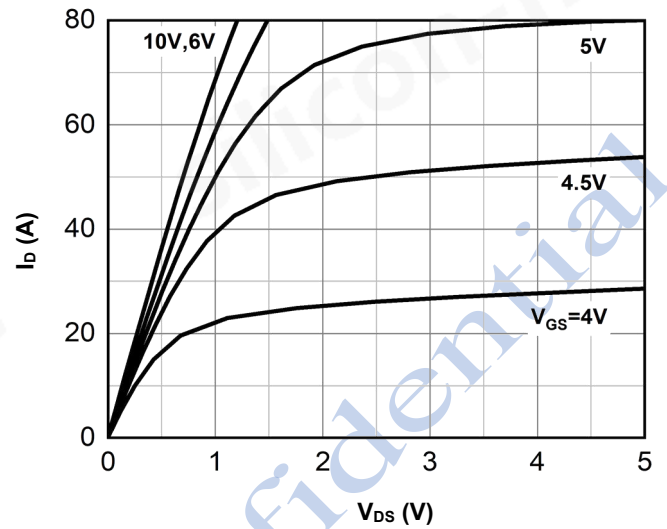


Fig.3 Normalized on-resistance vs drain current

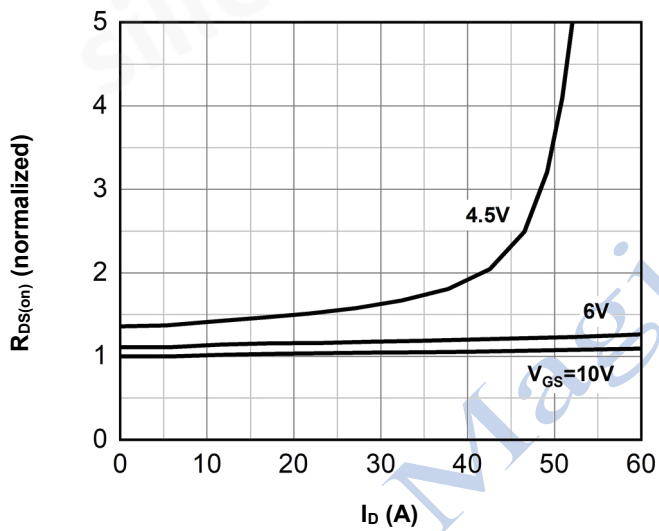


Fig.4 Typ. on-resistance vs gate-source voltage

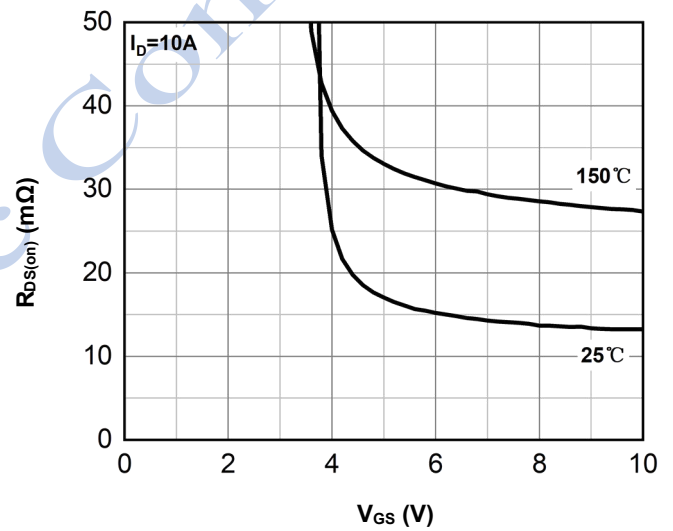


Fig.5 Normalized on-resistance vs junction temperature

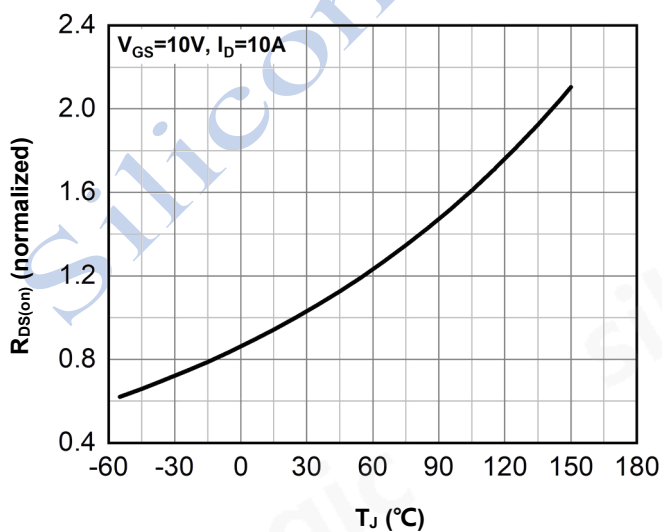


Fig.6 Typ. gate charge

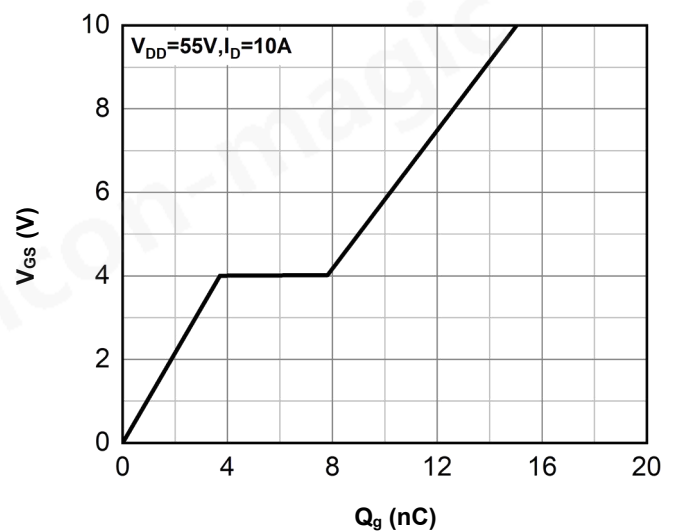


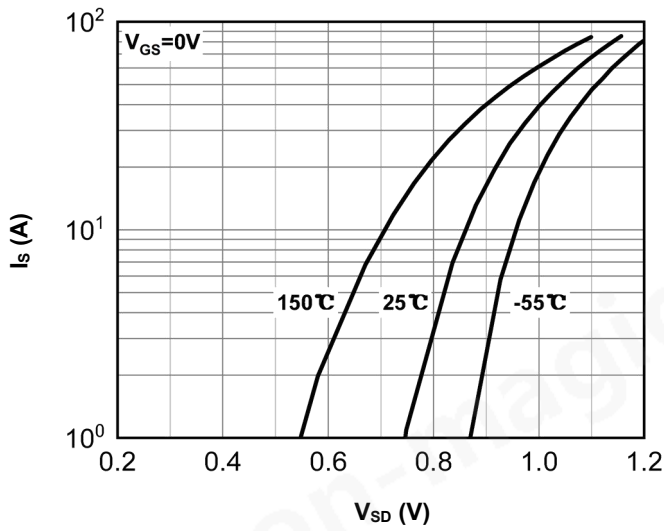
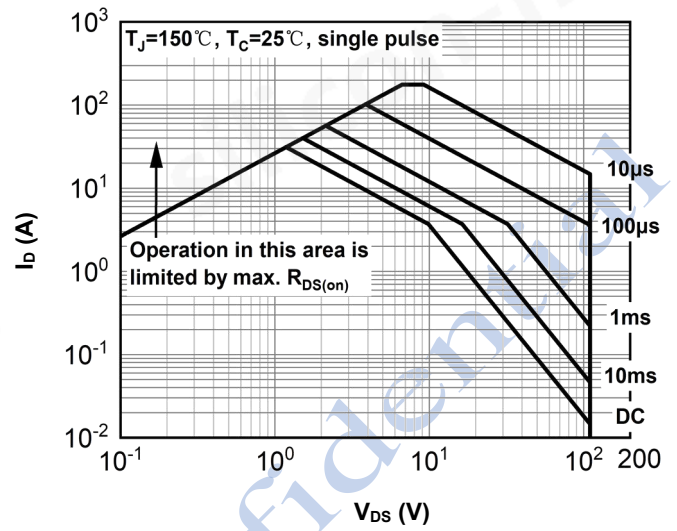
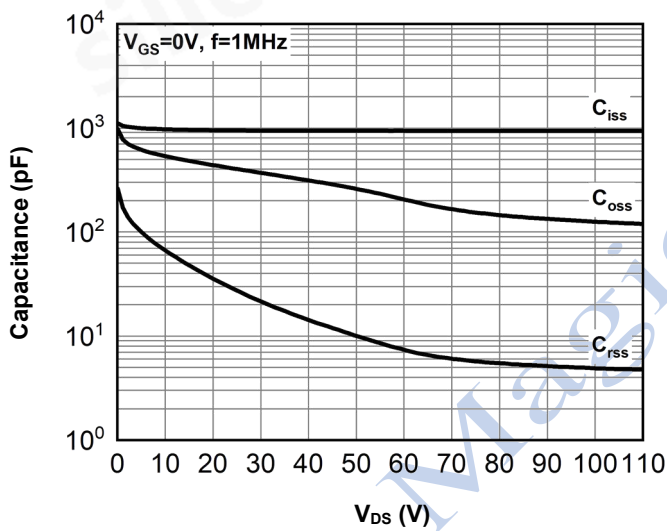
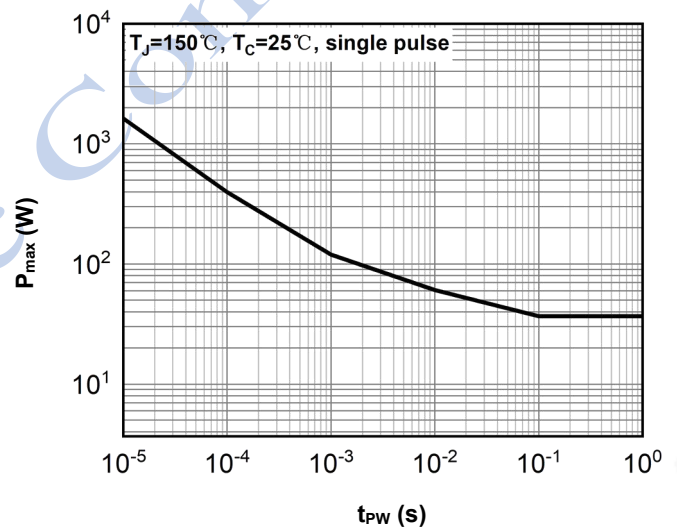
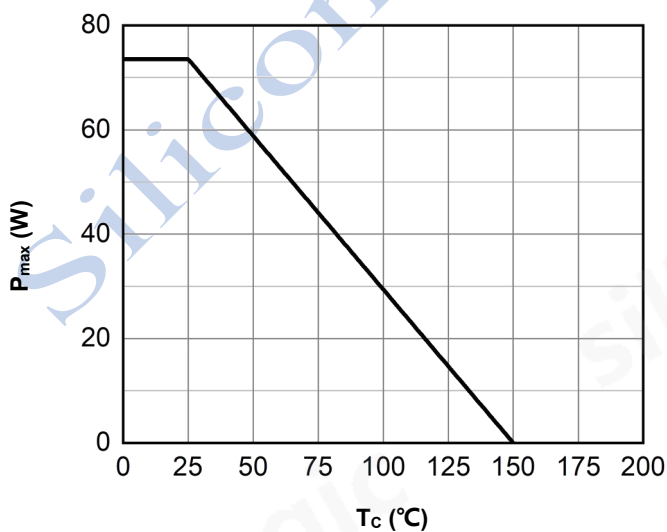
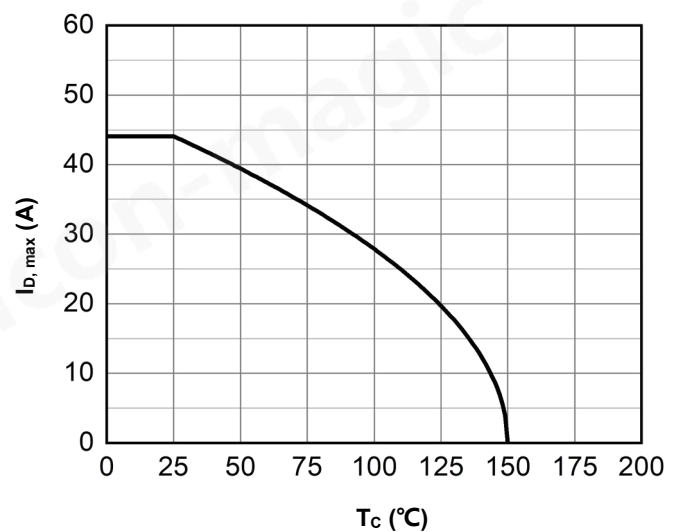
Fig.7 Typ. forward characteristics of body diode

Fig.8 Safe operating area

Fig.9 Typ. Capacitance

Fig.10 Single pulse maximum power dissipation

Fig.11 Max. power dissipation vs case temperature

Fig.12 Max. continuous drain current vs case temperature


Fig.13 Normalized $V_{(BR)DSS}$ vs junction temperature

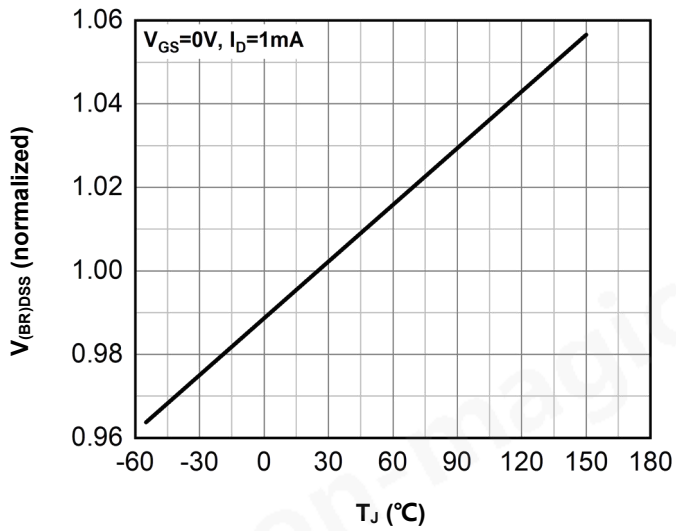


Fig.14 Normalized $V_{GS(th)}$ vs junction temperature

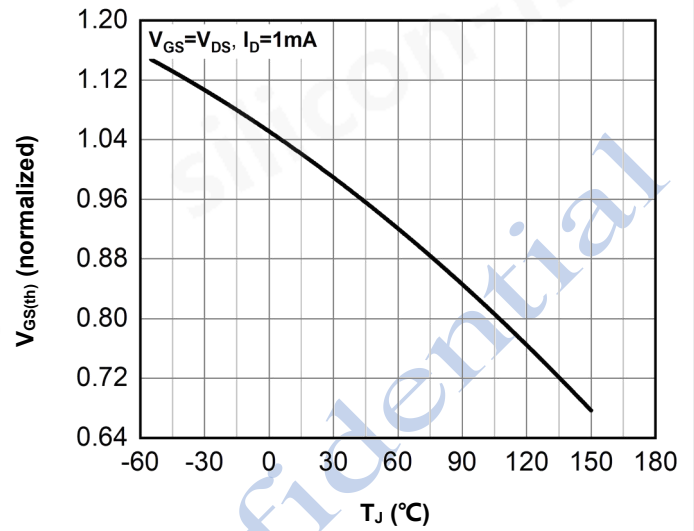
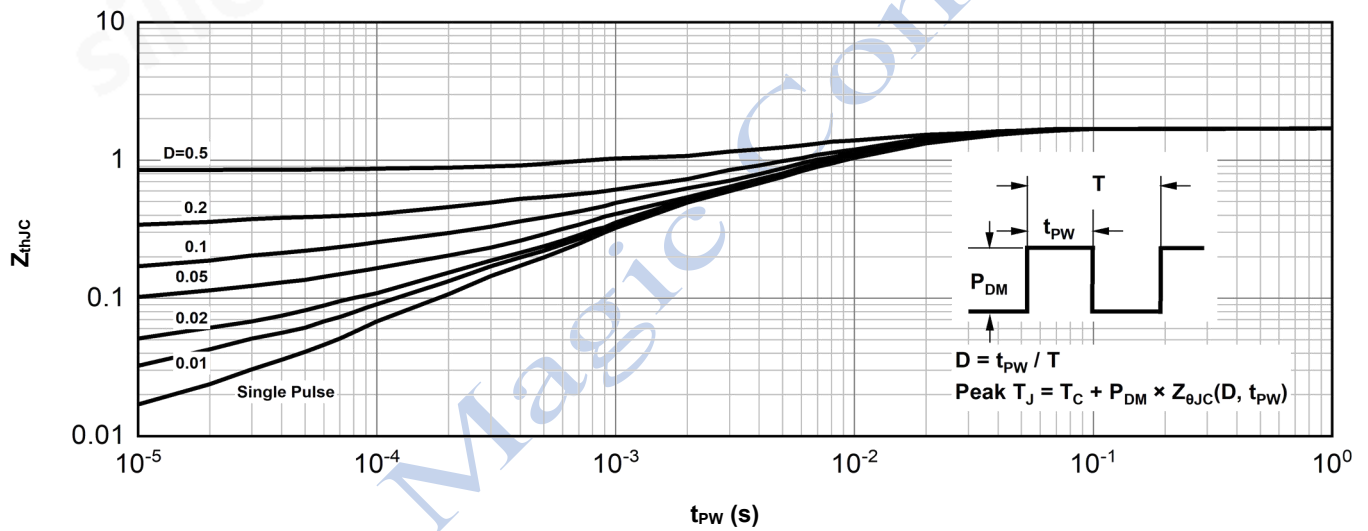
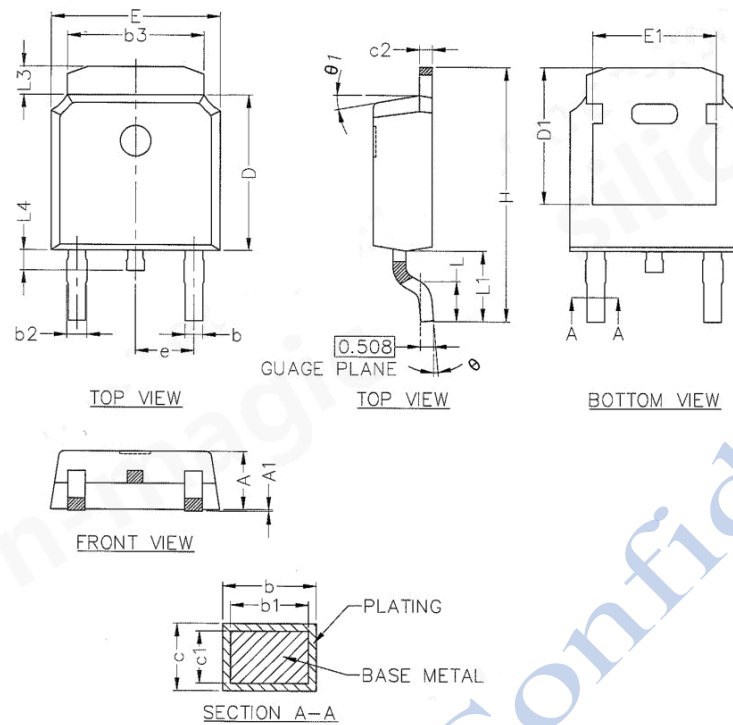


Fig.15 Transient thermal impedance from junction to case



5. Package outline dimensions



Dim	Millimeters		
	Min	Nom	Max
A	2.20	2.30	2.40
A1	0.00	—	0.12
b	0.65	—	0.89
b1	0.64	0.69	0.79
b2	0.76	—	1.10
b3	5.20	5.33	5.46
c	0.48	—	0.60
c1	0.47	0.50	0.55
c2	0.48	—	0.60
D	6.00	6.10	6.20
D1	5.21	—	—
E	6.50	6.60	6.70
E1	4.32	—	—
e	2.29 BSC		
H	9.70	—	10.20
L	1.40	1.55	1.70
L1	2.74 REF		
L3	0.90	—	1.27
L4	0.60	0.80	1.00
ø	0°	—	10°
ø1	0°	—	15°

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